THE REGULATORY CONTRACT AND ITS RELEVANCE TO STRANDED ASSETS UNDER RESTRUCTURING: A MODEST PROPOSAL

by

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1. Introduction and Overview

To paraphrase the contemporary bumper sticker, "in the economic, social and/or romantic affairs of man and/or woman, unexpected events happen." A more thoughtful interpretation of this notion would be that in economic and social interrelationships, individuals formulate behavioral plans based upon expectations about the state of the world and/or the behavior of other individuals. Should those expectations turn out to be incorrect, the individuals relying upon those expectations and their plans will be frustrated. The frustrated individuals may rail against their fate; they may accept their disappointment stoically. They may "take arms against a sea of troubles, and by opposing end them."[1] Alternatively and more likely in late twentieth century America, they may litigate (or threaten litigation) for breach of contract, claiming that some implicit or explicit, oral or written contract has been breached and that reliance upon that contract has consequently damaged them.

The discussion of assets potentially stranded by the ongoing restructuring of the U.S. electric power industry has been characterized by the latter response. As some utilities have faced the possible economic obsolescence of particular generation assets in light of technological changes and altered regulatory rules, they have invoked the notion of a "regulatory contract" having governed their expectations, behavior and past capital investment. Since restructuring threatens to render some of these expectations incorrect, these utilities argue they should be held harmless from changes in (or breaches of) the "regulatory contract". By implication, these utilities argue that they should be fully compensated for all cost incurred under good faith adherence to past regulatory processes and procedures.

In this report, we critically scrutinize various aspects of these claims. To do so, we first explore, in Section 2, the overall notion of the "regulatory contract". We indicate the source of the notion and the means by which this "contract" is implemented and enforced in practice. We further examine the historical "contractual performance" of the purported parties to the contract.

In Section 3, we explore the normative incentive issues arising with unanticipated changes in regulatory regimes in general and this purported

[1] William Shakespeare, Hamlet, Act III, Scene 1.

"regulatory contract" in particular. If it can correctly be argued that a "regulatory contract" exists, then there will naturally come times when that contract will need to be renegotiated. It is normally impossible to anticipate all possible times and issues that will be subject to future renegotiation. Hence, it is impossible to insure all parties to the contract against all possible contingencies. Any attempt to fully insure particular parties may have adverse impacts on incentives. We explore these incentive issues in Section 3.

Taking the discussion and insights gained in Sections 2 and 3 as a point of departure, in Section 4 we develop several proposals for renegotiating the "regulatory contract" with regard to treatment of assets that are "stranded" as a result of the restructuring of the electric power industry.

2. The Regulatory Contract

A. The Notion

Advocates of the notion of the "regulatory contract" as it pertains to the electric power industry contend that established regulatory procedures constitute a long-term agreement governing the behavior, expectations and obligations of all parties involved -- the regulated utility, the utility's customers and the public utility commission that acts as the agent for the customers. They argue that, as part of this implicit agreement, the customers in a given service territory could historically expect to receive reliable electricity service in exchange for the obligation to pay those costs prudently incurred in providing that service. The electric utility, in turn, the argument goes, was granted a long-term exclusive right to serve the retail customers in the service territory in exchange for accepting the obligation to serve all customers at minimum cost.[2] The public utility commission has had several

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[2] The so-called "Regulatory Compact" or "Regulatory Contract" seems to be a creation of Alfred Kahn and others in response to the most recent experience with "stranded" electric utility assets. It was articulated to combat the perceived unfairness of public utility commission disallowances of nuclear power plant costs. Kahn [1985] described this "compact" as follows:

> "The essential basis of public-utility regulation is an implicit bargain between consumers and investors that, in exchange for a monopoly franchise, the company accepts the strict legal obligation to serve all customers on reasonable terms. This means that shareholders accept a

responsibilities: first, to assure customers of the safe and reliable service that they expect; and second, to assure the utility the opportunity to earn just and

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> return on investment equivalent only to something like the market cost of capital -- the minimum that investors must see a reasonable prospect of earning if they are to put up the necessary funds -- along with the duty conscientiously to anticipate the future

needs of the public and to make whatever investments may be necessary in order to meet them efficiently.

> This means that if the company makes a particularly successful investment -- and there have been many such -- the lion's share of the benefit goes to the consumer. ...
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> The other side of the bargain is, and has to be, that investors are permitted to earn that same minimum return also on the dollars that they put into investments that turn out sour. If they can earn the cost of capital only on the successes and not on the failures, it follows that they will earn less than the cost of capital on all their dollars, taken together. And investors won't play that game once they understand that those are going to be the rules."

As we develop below, we believe that a better way of describing this "bargain" is that, in exchange for the franchise to serve, regulated utilities agree to behave like a competitive firm, where such behavior includes efficient operational decisions in the short term and efficient capacity expansion decisions in the long term. If utilities behave in that fashion, they will earn, <u>on average</u>, a rate of return that would attract the overall <u>level</u> of investment and the <u>specific</u> capital investments generated in a competitive market.

Parenthetically, actual events as described by Professor Kahn elsewhere (see footnote 8) have diverged from this characterization. Specifically, actual rates of return over the last 50 years have diverged considerably (**have been above**) and for long periods of time from the market cost of capital that Kahn describes. Indeed, if actual rates of return were above the cost of capital for substantial periods of time (as documented by Kahn) and were not allowed to fall below the cost of capital for other periods of time when "investments .. turn out sour," then investors "will earn **more** than the cost of capital on all of their dollars, taken together." Investors would be delighted to "play that game."

Returning to the "regulatory bargain," this bargain merely confers a license to the utility "to manufacture and supply [electricity] for a particular locality and to exercise special rights and privileges in the streets and elsewhere which are essential to the proper performance of its public duty and the gain of its private emoluments and without which it could not exist successfully" (*Attorney General v. Haverhill Gas Light Company*, 215 Mass. 394, 399 (1913)). However, the utility "enjoys these privileges as licensee and without any paramount or exclusive right therein" (*Id.* at 402). Indeed, the notion of "franchise bidding" in the economics of regulation takes as given the fact that the license to serve is not exclusive. See, for example, Williamson [1976].

reasonable compensation for costs prudently incurred in providing service (i.e., the prudence and the used-and-useful tests[3]).

Two important regulatory tools have been used to effectuate and compensate responsible utility behavior regarding service: the regulated rate of return and the rate base against which the regulated rate of return has been applied. Let us call these tools two the "detailed terms" of the "regulatory contract". In order for utilities to be able to attract capital, they must be able to earn on their assets a rate of return that is competitive relative to the economy at large and that is therefore adjusted for the particular risks arising in their business.[4] If utilities are not allowed to earn, on average, a competitive, risk-adjusted rate of return on their assets, they will not be able to attract the capital necessary to effectively and prudently serve the customers they are obligated to serve.[5]

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[3] The "used and useful" concept dates from the first attempts by government to regulate companies. The Supreme Court first articulated the basis for the concept in *Smyth v. Ames,* 169 U.S. 466, 547 (1898) stating, "What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience." As explained further in *Washington Gas Light Company v. Baker*, 188 F.2d 11, 18-20 (D.C.Cir. 1950), *cert. denied* 340 U.S.952 (1951), property that is rendered obsolescent by economic forces is not "used and useful". In order to be included into rates, an investment must be prudent when made and used and useful in current public service. "While prudence judges an investment or expenditure in the light of what due care required at the time an investment or expenditure was planned and made, usefulness judges its value at the time its reflection in the rate base is under consideration." *Appeal of Conservation Law Foundation*, 127 N.H. 606, 629-30 (1986).

[4] See Kolbe and Tye [1992] and Sharpe and Alexander [1990].

[5] Kolbe and Tye [1992] explore alternative interpretations of this requirement. Notice that advocacy of the use of a regulated rate of return adjusted for any risk makes explicit the uncertainty of utility investments and thereby argues against holding shareholders harmless for specific asset investments. Specifically, if shareholders are fully compensated for stranded assets as a matter of principle, they should **not** earn a risk-adjusted rate of return, since their investment was riskless. Instead, they should earn a "riskless" rate of return comparable to that paid by "similarly situated" public bodies. Notice further the implication for the point made in footnote 2. If we allow utilities to earn more than their risk-adjusted cost of capital for certain periods and if we insure that they earn at least their risk-adjusted cost of capital for all other periods, then we shall have eliminated all risk for the relevant investors and have compensated them in excess of the compensation

The requirement that utilities earn a "fair" (risk-adjusted) rate of return on those assets needed to "efficiently" provide service protects both the utilities and the ratepayers. Accordingly, utilities are compensated for assets prudently acquired; they are not undercompensated for "proper" investment decisions. Likewise, ratepayers are not expected to pay for assets that were not prudently acquired; they are not required to pay for assets that were the result of "improper" investment decisions.

If the regulator uses the allowed rate of return and the prudence test effectively and as they were designed, and if supply side and demand side uncertainties are symmetric, ratepayers would pay on average no more than they would pay in a competitive market.[6]

B. In Practice

The notion that regulators have employed traditional rate-of-return rate making methods (including the prudence test) to mimic competitive market forces as part of a "regulatory contract" is a useful paradigm. However, it is only a paradigm. No "regulatory contract" has been signed.

The term "regulatory contract" is used to describe what appears to be standard operating procedures. To the extent that the operating procedures described as the "regulatory contract" have indeed been standard over time, the notion of a long-term implicit agreement will gain credence. Let us therefore examine how the procedures referred to as the "regulatory contract" have been implemented in the past.

We find, in reality, that actual regulatory experience has deviated considerably over time and has not adhered continuously to the detailed terms of the regulatory contract.

For example, in its early stages, technological developments in the industry primarily involved improving the operating economies of generating units and plants. Fossil-based generation technologies were well understood, and scale economies were easily accessible. The size of existing generating units and plants was increased to capture increasing returns to scale, thereby

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offered by competitive markets.

[6] See Joskow and Schmalensee [1986], pp. 8-12, which this discussion paraphrases liberally.

lowering average generation costs. Regulators attempted to foster such growth. Because generation constituted the major activity of the geographically isolated utility, average total costs declined with plant scale. As a result, firm efficiencies were driven by generating plant efficiencies. The minimum efficient size of a particular firm was essentially determined by the efficiency of each of the utility's plants and the ability of the portfolio of plants to efficiently respond to the mix of baseload, intermediate load and peaking load in the local service territory.[7]

Joskow [1974] argues that the pervasive presence of such returns to scale had a fundamental effect on electric utility regulation from the 1930s through the 1960's. During this period, the availability of scale effects allowed utilities to continually lower average costs. While public utility commissions claimed to regulate using allowed rate of return, they were in actuality most interested in keeping regulated retail rates constant or slightly declining. Since the average costs of generation and service declined with scale while retail rates remained constant, utilities were able to increase profitability considerably and effectively **avoid** rate of return regulation. Utilities and ratepayers asked for rate hearings and challenged the prudence of particular investments **infrequently or not at all**. Regulatory commissions were not overburdened and followed a hands-off approach.

Hence, for a good twenty-five to forty years, utilities were able to ignore or avoid the detailed terms of the "regulatory contract" as interpreted above. Actual rates of return were not constrained by allowed rates of return; indeed, they were frequently well above the cost of capital.[8] There was little or no argument for mitigating these economic results, even though they deviated from the "regulatory contract". Specifically, industry advocates

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[7] For more detail, see Hartman [1996], from which this discussion excerpts.

[8] In referring to this period, Kahn [1988] states, "the sharp appreciation in the prices of public utility stocks, ... reflected also a growing recognition that the companies in question were in fact being permitted to earn considerably more than their cost of capital. Perhaps, indeed, the discrepancy was growing over time: as the data ... demonstrate, the return on equity among the public utilities increased markedly relative to manufacturing in the two decades after World War II."

never proposed that "windfall" profits in excess of regulatory expectations should be eliminated through reduced rates.

Over the past twenty-five to thirty years, however, a variety of technological and economic forces have altered these conditions. Economists, and others, at first suspected and now clearly recognize that economies of scale in generation were effectively exhausted by the late 1960s.[9] In spite of that, throughout the decade of the 1970s and into the early 1980s, the electric utility industry continued to build large nuclear and coal facilities located at considerable distance from loads. On the engineers' drawing boards there may have been some limited scale economies still to be achieved with these investments. The reality of operation of the more complex units, however, in addition to the overall increase in system reserve costs necessary to cover the eventualities (all too frequent) of unscheduled outages quickly swamped the unit scale efficiencies.[10] Only too slowly the

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[9] Loose and Flaim [1980] examine the relative costs of large and small generating units, taking into account both economies of scale and unit reliability. Larger units offer greater scale economies at the expense of greater capital investment for higher reserve margins. Using production cost simulations, the authors find that the higher reserve margins required for larger units outweigh their production savings. Installing several smaller units results in lower costs to the utility. They contend that scale economies are exhausted at unit sizes of 500 MW for fossil units.

Schroeder, Wiggins and Wormhoudt [1981] examine and contrast the possibility of configuring large coal-fired power plants with either large (800-1,300 MW) or small generating units (400-600 MW). They contend that the construction of large plants (1,500-5,000 MW) composed of small units yields two sets of benefits: those associated with large-plant scale economies and those associated with small-unit flexibility and reliability. The small units avoid reliability problems experienced with the larger units.

[10] Behrens [1985] contends that large nuclear units have become very difficult to finance for U.S. utilities. Using a simulation model for the New York Intertied System, he demonstrates that economies of scale of large plants (1200 MW) tend to be outweighed by financing difficulties that are avoided if small plants (400 MW) are constructed.

Summarizing a variety of analyses, Joskow and Schmalensee [1983] claim that unit-level scale economies are exhausted at the 300-500 MW range for fossil-fuel units; 900-1200 for nuclear units; and 800 MW for fossil-based plants.

industry discovered that "bigger is not better"[11] and found itself with assets that were already "stranded" to a certain extent by its slow adaptation to technological changes. In the end, the "slow" learning curve of the industry had a significant impact on the type and cost of generating units now in operation. The slow substitution from larger to smaller units had an impact on the level of reserves required to maintain reliable supplies -- a cost now being borne by all electricity customers.

The exhaustion of scale economies was not the only technological change that stranded assets. A second technological change was the shift from single cycle steam thermal units that achieved efficiencies in the 35-40% range to gas turbine combined cycle (CCGT) technologies that now achieve efficiencies of 50%.[12] These units, which exploit scale efficiencies at sizes as small as 225-250 MW, represent a significant technological shift for the industry. They are highly modular; they can be built on a licensed site in roughly two years; their fuel arrives under ground; and they are environmentally more acceptable burning natural gas than are their competitors burning either coal or oil.[13]

Hence, technological change over the last twenty-five years has altered the economic desirability of particular generation assets of those utility's which adapted too slowly, thereby stranding certain units. This stranding has occurred **regardless** of shifts in regulatory regimes. At the same time, profound macro-economic changes have occurred and have contributed to

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[11] For further discussion of the economies of scale in nuclear generation, see Lee, Ball and Tabors [1990].

[12] The industry response to the more efficient CCGT facilities was also quite tentative and slow. In the early to mid 1980s, the advantages of these units was recognized in academic circles. However, the industry did not respond in any meaningful fashion until subjected to competition from independent power producers for whom these technologies were the most attractive financial alternatives. That competition made clear the fact that existing technologies were being superseded, and stranded, by these alternative technologies. See Tabors and Flagg [1986].

[13] For example, a recent study indicates that CCGT units reach minimum efficient scale at 225-250 MW and that CCGT plants of 2-4 units (say 450-1000 MW) are optimal (MES) to exploit site economies. See Charles River Associates and Energy Ventures Analysis [1996].

limiting scale economies. The two most important economic changes have been the general inflationary pressures over 1975-1985, which raised the cost of capital, and the disequilibrium in fossil fuel markets initiated by OPEC activities in the 1970s. As a result of OPEC activities, the cost of fossil fuels rose significantly in the 1970s, and after demand adjusted to those increases, the prices of fossil fuels declined just as precipitously. The effects of these forces were substantial. The increases in the cost of capital made capital intensive projects less desirable. As a result, large scale generating plants, characterized by complex environmental regulation, became subject to severe financial diseconomies.[14] The escalation in fuel prices over the 1970s made power generally more expensive, while the subsequent decline in fossil fuel prices over the 1980s led to a variety of distortions in particular fuel markets.[15]

These technological and economic forces, in turn, fundamentally altered the prevailing regulatory environment. The earlier profitability obtained through the exploitation of scale economies in the face of constant regulated retail rates disappeared (Joskow [1974]) while the concomitant riskiness of utility investment increased considerably. In the face of inflationary pressures and environmental concern, average generation costs and average total costs began rising significantly in the late 1960's. With constant retail rates, utilities began losing money. Rate of return regulation became binding for the first time. There arose a massive demand for rate

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[14] Indeed, many economists argued that the cost of capital to utilities became greater than the allowed rate of return, and as a result, these economists argued, no expansion of utility-based generating capacity occurred. See Joskow and MacAvoy [1975].

[15] For example, events in the U.S. natural gas markets over the 1980s have been well documented. These economic events accelerated the de-regulatory initiatives begun in the late 1970s. The result was the restructuring of the gas industry as implemented primarily by the FERC through Orders Number 436, 500 and 636. These substantial economic and regulatory changes have obviously and pervasively impacted the economics and regulation of the electric power industry. These events have also impacted minimum efficient scale in the industry, given the reliance upon gas fired turbines for new capacity.

For greater discussion of the events in the gas industry, see Doane and Spulber [1994], Broadman [1986,1987], Hubbard and Weiner [1986,1991], and Mulherin [1986a,1986b].

increases by the utilities, overwhelming public utility commissions accustomed to a quieter hands-off approach. The public began intervening in the rate hearings, aggressively identifying imprudent investments, and demanding cost containment. A variety of statutory and regulatory changes were implemented to contain costs, initiate energy conservation, stimulate technological developments and alternative sources of energy.[16]

The implications of these changes for the detailed terms of the "regulatory contract" were the following: first, utilities were generally not able to include all investments into their rate base as "used and useful" assets; and, second, utilities argued that their allowed rate of return has been less than their true risk-adjusted cost of capital. They argued, in the process, for some mitigation from these changes in the interpretation of the terms of the regulatory contract. Notice incidentally that these arguments have been asymmetrical. If utilities should be compensated for windfall losses devolving from a cyclically punitive implementation of the detailed terms of the regulatory contract, they should also be taxed for the windfall gains devolving from a cyclically beneficial implementation of the regulatory contract over the 1930s-1960s.

C. Implications and Interpretations

To the extent that a "regulatory contract" has indeed existed and governed the behavior and expectations of the parties to the contract since its inception, then it would appear that the detailed terms of contract have been implemented only loosely over its full history. In the early period of its implementation, technological and economic conditions were such that utilities were considerably more profitable than had been designed as part of the "regulatory contract." During the last 25 years of its implementation, it has been argued that utilities have been considerably less profitable than

[16] For an overview, see MacAvoy [1983]. Joskow and MacAvoy [1975] describe the financial distress of investor owned utilities (IOUs). Joskow [1979] describes the economic responses implemented into the Public Utility Regulatory Policy Act of 1978.

designed as part of the contract, at least in the early stages of that period.[17]

Furthermore, to the extent that a contract has indeed existed, it would appear that it has been subject to revision. There was a clear change in its implementation in the 1970s. As Joskow [1989, p. 148] describes this period, "whether 'the regulatory compact' has been broken or not, it has certainly changed dramatically."

At the time of the revision, no one argued that the changes should not take place, based upon the precedents set by past implementation. Certainly, the industry did not advocate adherence to past procedures simply because those past procedures could be interpreted as evidence of a "long-term agreement".[18] As with all legal systems, procedures adapted to the changing social and economic needs at the time,[19] and compromises were made by all parties to the "regulatory contract".[20] Indeed, the industry argued that even greater deviation from past procedures were required by the changing economic conditions. For example, utilities argued that adherence to the "prudence review" (with the used and useful test) had become too punitive, as demand declined and stranded costly generating capacity.[21]

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[17] It was during the early years of this period that the disruptions described above occurred. The decline in profitability during those years is described by Joskow [1974] and Joskow and MacAvoy [1975]. However, we understand that recent NARUC studies indicate that electric utilities have out performed, on average, the Standard and Poors 500 for a 20 year period ending in 1992 and that NEES has out performed General Motors over the last 10 years. While these comparisons are indicative only, they suggest that a more careful comparison of actual and allowed risk-adjusted returns is required to assess whether utilities have been earning rates of return above allowed rates during the last 25 years.

[18] Specifically, the industry did not argue, as far as we know, that it should continue to earn rates of return above allowed rates.

[19] For a general discussion of the evolution of legal systems, see Demsetz [1963,1967].

[20] Specifically, closer scrutiny was applied to all investments and some were deemed prudent and some were not; some were deemed used and useful and some were not. Likewise, arguments were put forward why the now constrained rate of return was not sufficient to draw capital into the industry. See Kolbe and Tye [1992].

[21] In the past, passing the "used and useful" or prudence test was implicit for the most part, because economic conditions, notably load growth

Finally, it must be pointed out that the terms of the "regulatory contract" have continued to evolve and be subjected to compromise since the 1970s. Statutory examples of that evolution and compromise are found in the Public Utility Regulatory Policy Act of 1978 and the Energy Policy Act of 1992.

In light of this history, advocates of the notion of a "regulatory contract" governing the electric power industry must conclude the following. The notion of a "regulatory contract" governing behavior, expectation and responsibilities in the electric power industry must be interpreted as an informal, and perhaps quaint, way of describing long-run, continually-evolving operating procedures for regulating the industry. To the extent that it exists, the contract must be taken to be informal and loose. If it were not, then the contract was breached by the industry and the regulators from its inception through the late 1960s.[22] Over its long duration, the detailed terms (and their interpretation) of this "contract" have changed considerably. As those changes have occurred, all parties to the "contract" have compromised on the financial implications of those revisions. And finally, to the extent that unexpected changes in the detailed terms of the regulatory contract were mitigated by the regulators (in the 1970s-1980s) that mitigation would have

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exceeding 7% per year, made almost all investments prudent.

Notice that while most utilities argued that these newly binding regulatory constraints were inappropriate, inefficient and "unfair" in light of reliance upon past (1930-1965) "looser" regulatory procedures, these responses were precisely the long-run economically efficient responses. Over the 1930-1965 period, actual rates of return appear to have been greater than allowed rates of return, thereby stimulating the growth of capacity and scale economies to meet increased demands. These were the correct industry responses for that period. Over 1970-1995 however, actual rates of return declined relative to allowed rates of return, and may have fallen below allowed rates for part of that period. As a result, the growth of capacity **that turned out to be economically obsolete and stranded** at the end of the period was discouraged during the period. If the regulators had mitigated the effects of these constraints, the industry response would have been to invest even more significantly in capacity that turned out to be technologically and economically obsolete and stranded.

We discuss these incentive effects of mitigation in Section 3 below.

[22] To the extent that the NARUC studies mentioned in footnote 17 are dispositive, the "contract" may have been breached similarly over the last 25 years.

adversely affected the adaptation of the industry to the underlying economic forces (see footnote 21).

3. The Incentive Issues Arising With Revisions of The Regulatory Contract

A. Overall Incentive Issues

The transition from one legal or regulatory regime to another always raises the issue of frustrated expectations and transition costs. To the extent that parties rely upon the detailed terms of a legal/regulatory regime and make long term commitments based upon that reliance, those parties will most likely suffer windfall gains or losses as a transition revalues the assets put in place to meet those long term commitments. In a legal system where due process figures importantly, the question that inevitably arises with any transition is whether the windfall gains or losses arising with transition should be mitigated.

While some participants in the electric power industry have been quite vocal recently about reliance upon regulatory regimes and the windfall losses induced by that reliance, it must be noted that this problem is not specific to this restructuring. Legal and regulatory regimes are continually evolving and subjecting reliant parties to unanticipated transition costs and benefits. To name but a few examples, consider the following:

- Manufacturers and agricultural users of a given chemical pesticide are told that after several years of testing, the government is banning the manufacture of the pesticide and will classify the aquifers into which the pesticides have drained as contaminated and unfit for agricultural use and for human consumption and recreational use. In response to this ban, the equity value of the manufacturer declines by 40% and the property values around the relevant aquifers decline by 50%.

- Congress announces that in light of Steve Forbes "innovative" campaign platform, it is implementing a flat tax and eliminating all mortgage deductions. As a result, the resale value of all residential property falls by 5-15%.

- After years of activism, Ralph Nader convinces Congress to ban the sale of cigarettes in the United States. In response, the equity value of the tobacco producers falls by 42% and the value of agricultural land falls by 61% in the affected states.

- Congress passes an omnibus telecommunications act which allows for greatly expanded competition for a subset of telephony and cable TV companies. In response, the equity value of the firms benefiting from the legislation increases while the equity value of the firms adversely impacted declines.

- Administrative deregulation of the U.S. airline industry started in 1976 and was followed by legislative deregulation in 1978. By 1983 the industry was essentially fully deregulated. Prior to deregulation, Civil Aeronautics Board rate regulation allowed larger mark-ups on long distance flights, thereby stimulating industry investment in large wide-bodied planes. Those investments were stranded by deregulation, and the costs of that stranding were borne entirely by the industry.[23]

Each of these examples involves a transition from one regulatory or legal regime to another. In some cases, the regulatory transition is confounded by technological transitions. Each involves a situation where reliance upon the early regime necessitated a long-run financial commitment to certain assets. Before enactment, the probability of each transition was uncertain but non-zero, and some of the transitions were more predictable than others. Finally, these examples are merely several of many that can occur and do involve the transition in a regulatory regime that results in stranding (devaluing) certain assets.

The question that arises with each and every such transition is whether the government should mitigate all or any of the windfall gains and/or losses that are caused by the transition. There are a number of perspectives that one can bring to bear on this question. The perspective most familiar and comfortable for economists is one regarding economic incentives and risk bearing.[24] From this perspective, the conclusion seems to be that any transition relief, whether in the form of compensation for windfall losses or taxation of windfall gains, is inefficient. The basic intuition underlying this conclusion is that the ex ante incentives for investment to adjust optimally to the prospect of deregulation will be blunted and/or distorted if investors

[23] See Winston [1985].

[24] Kaplow [1986] develops several other perspectives, including fairness considerations and institutional constraints.

anticipate that transition gains or losses will be mitigated.[25] In an economy with fairly complete information, the efficient level of investment is that induced when the investor bears all the real costs and benefits of their decisions. If the government offers transitional relief for a failed investment, it introduces an externality that disrupts the market response to risk engendered by uncertainty concerning that risk, whether the risk be technological, market or regulatory. The result will be too much investment in the risky asset and too little self-insurance against risk.[26] These conclusions hold for transition mitigation that is committed to ex ante. Ex ante, it is sensible to conclude that if someone (the government, the insurance company, your parents) will compensate an economic individual for incorrect decisions under uncertainty, that individual will lose the incentive to make the correct decision. Ex post, these arguments are somewhat less compelling. In that case, the economic decisions have been made, the assets have been sunk, and incentives regarding those investments will not be distorted. In this case, there may be an argument on the grounds of fairness or equity for transition mitigation. However, it must be noticed that this argument is not unambiguous. To the extent that ex post mitigation alters the ex ante expectations of market participants concerning the possibility of transition mitigation generally, then ex post transition mitigation also becomes distortionary and therefore undesirable. Finally, it should be noted that the distinction between ex ante and ex post transition mitigation is, in most cases, an artificial one. Transitions in regulatory regimes (or in "regulatory contracts") occur gradually over time, with much debate and discussion. Hence, the ex ante perspective is relevant for a long time, which implies that at any time during the gradual transition, transition mitigation will only blunt incentives and make the transitional response more prolonged and socially

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[25] This conclusion is no different than that regarding government mitigation of market risks engendered by uncertain demand or technological change. In these cases, mitigation is generally considered inappropriate. For specific examples, "making transitional relief generally available to firms found to have produced dangerous products or caused pollution would encourage inefficient behavior in the same manner as would relief for firms whose products prove to be inferior or ineffective and thus unprofitable"; Kaplow [1986, p. 513].

[26] See Kaplow [1993].

more costly.

B. Implications for Restructuring the Electric Power Industry

The implications for the proposed restructuring of the electric power industry are fairly straightforward. To the extent that transition mitigation of any kind is expected ex ante, the incentives of the market participants will be inappropriately blunted and the social costs of restructuring will be too high. More specifically, the extent to which stranded assets are mitigated will only blunt the incentives of the relevant participants to economically retire those assets.

Furthermore, the argument that the ex post rather than the ex ante perspective is the proper one and that, therefore, mitigation will have no adverse effect upon incentives is, at best, a tenuous one. The reason is that restructuring has been occurring since 1978, the year of the passage of the Public Utilities Regulatory Policy Act, and has been accelerated by the passage of the Energy Policy Act of 1992. These events signalled an ex ante increase in the risk of some form of restructuring,[27] risk that must be borne by the participants of the industry in order for their incentives to be correct. To the extent that this risk is made external to these decision makers, economic choices will be social inefficient.

One need merely look at the policy debate during the 1970s for evidence of how transition mitigation can distort incentives. As mentioned in Section 3 above, during the late 1970s and early 1980s, regulators made much greater use of prudence reviews than they had in the past.[28]

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[27] In describing markets for wholesale power, Joskow [1989, p. 189] states, "The experience since the enactment of PURPA indicates that there exists a very elastic supply of capacity that independent producers are willing to offer at attractive prices. In addition, active markets for short- and medium-term power in excess of the current needs of integrated utilities have emerged in most areas of the country. ... the anecdotal evidence suggests that these markets are often very competitive." Such evidence certainly had to suggest that some generation assets were in danger of becoming strandable as early as 1980.

[28] There were only 10-12 prudence review cases between 1945-1975. See Federal Energy Regulatory Commission, Notice of Proposed Rulemaking Re Regulations Governing Independent Power Producers, Docket no. RM88-4-000 (March 16, 1988), p. 13.

Furthermore, when the regulators could not find that particularly expensive (and therefore "objectionable") capacity was imprudently added, they exploited the "used and useful" concept to exclude that capacity from the rate base (i.e., to strand those assets).[29] Utilities argued, obviously, that this was a breach of the "regulatory contract," and that the changes should be mitigated in some way.[30]

The fact that these transitional procedures were not mitigated however allowed for the correct incentives to prevail:

> Utilities learned that if they built large new generating plants, they might very well not recover their investment: commissions might resist large rate increases even if the increases were fully justified. As a result, the expected return on investments in new generating plants subject to regulation [was] perceived to be below the cost of capital. Few utilities appear[ed] willing to build large base-load facilities, even in areas where additional capacity [was] needed. Instead, they [were] looking to third parties, smaller and less capital-intensive generating technologies, and investments in customer conservation to reduce the financial risks."[31]

It would seem, therefore, that while utilities chafed under the onus of assets the stranding of which was unmitigated, this stranding did indeed have the correct incentives regarding that capacity. To the extent that such stranded assets were mitigated, we contend that the response of the utilities would have been more prolonged and more costly.

Similar conclusions obtain for transition mitigation in other network industries. For example, Meyer and Tye examine the consequences of deregulation in the transportation sector. They state

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[29] The reason that the used and useful concept was not an important issue until this time in history is that no prudence reviews were requested or conducted during the long earlier period of increasing demand and scale economies.

[30] However, the impact upon utility shareholders was not mitigated and they "ate roughly 20% of their investments in nuclear power plants, amounting to tens of billions of dollars." See Joskow [1989, p. 161]. Hence, to the extent that a "regulatory compact" did exist, the precedent set within that compact was for incomplete mitigation only.

[31] Joskow [1989, pp. 161-162].

"In general, any deregulated industry should not be encouraged to use residual regulation during the transition process to seek additional ways to preclude efficient choices by [customers], ... Such a policy will only encourage those customers to seek out alternatives that do not use these recently deregulated services while perhaps tempting [providers] and regulators to seek new ways of restricting competition in an effort to extend the transition period."[32]

4. Proposals for Assets Stranded as a Result of Restructuring

Several issues have been raised in the preceding sections. We summarize them as follows.

- An interpretation of the history of regulatory actions under the notion of a "regulatory contract" indicates the following. To the extent that it has existed, the contract has been loosely interpreted. The detailed terms of the contract have been subject to changing interpretation and enforcement. Likewise, the parties to the contract have expressed changing opinions regarding the extent and desirability of its enforcement.

  For example, the industry did not argue for mitigation when it was the beneficiary of incomplete "contract" enforcement. However, the industry did argue for changing (mitigating) the detailed terms of the contract when they became binding (in the forms of the "prudence review" and the "used and useful" test). If such mitigation had been allowed, it would have had adverse incentive effects and would have increased the social costs of the transition.

- Normative analysis of the effects of transition relief upon economic incentives argues persuasively against ex ante mitigation and against ex post mitigation when such mitigation will impact ex ante incentives for resource use and risk bearing. To the extent that the restructuring of the electric power industry finds itself in an evolving ex ante world, transition relief is economically inefficient.

We conclude from these discussions that government mitigation of stranded assets is not required by historical precedents regarding the enforcement of the "regulatory contract". Furthermore, and more importantly, we find that mitigation of stranded assets would constitute a serious interference with economic incentives and risk bearing as the electric power market evolves

[32] Meyer and Tye [1985, p. 50].

under restructuring.

In spite of these conclusions, transition relief for stranded assets may still be allowed, if only for the political need to insure the active participation of all parties in an orderly transition. If a decision is made for relief on such a basis, we contend that the following guidelines should be reflected in that mitigation.

- To the extent possible, the decision to allow mitigation for assets the stranding of which occurred **because** of the regulatory changes flowing from restructuring should be evaluated differently than the decision to allow mitigation for assets that had **already been stranded** by technological change over the last 20 years **and would have been stranded** absent restructuring.

- To the extent that utilities are to be compensated for windfall losses embodied as stranded assets, there is no economic basis for the contention that shareholders should be held harmless, i.e., that 100% of the windfall losses be compensated. Indeed, relevant welfare analysis may argue for the shareholders to bear all of the losses.[33] However, a substantial weight of historical precedent is on the side of partial mitigation. Indeed, as articulated elsewhere, "rough justice" argues for the windfall losses to be borne by both rate payers and shareholders.[34]

- To the extent that the windfall losses and/or gains in asset values experienced by utilities as a result of restructuring should be mitigated, that mitigation should include **all utility assets.** It should not be limited only to generation assets.

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[33] Welfare analysis argues that the contracting party who is more able to protect itself against loss should bear the risk of that loss. Given the transactions cost involved, it is difficult to argue that consumers of electricity are better situated to protect themselves than are investors. See Posner and Rosenfield, "Impossibility and Related Doctrines in Contract Law: An Economic Analysis," 6 *J. Legal Stud.* 83, 90 (1977).

[34] See Pierce [1994, pp. 326-327], where he states in his discussion of restructured natural gas markets, "we will have to be content instead with some crude measure of 'rough justice.' ... In our search for rough justice, we can rule out both requiring regulatees to absorb 100% of the transition costs and allowing regulatees to reallocate 100% of transition costs. Rough justice lies somewhere between these polar extremes."

Some form of "rough justice" (incomplete mitigation) also characterizes the electric power industry during the 1970s-1980s (see footnote 30) and the recent restructuring of other industries (see p. 13 above).

If utility assets have been subject to a "regulatory contract", then that contract must include the generation, transmission and distribution assets of the companies. Whatever windfall losses do arise with generation assets, they must be netted against windfall gains (if any) in the transmission and distribution assets of the companies. To the extent that restructuring in electric power and telecommunications increases the value of the local distribution assets, that increased value should be netted against stranded generation assets.

- Appropriate methods need to be identified for ascertaining the market value of all utility assets before deciding the net amount of assets "stranded" by restructuring. We believe that auction theory offers a sufficiently rich variety of methods for estimating such value and should be appropriately exploited. The application of auction theory and methods to the valuation of stranded assets is discussed by Robert Wilson below.

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